

**Sixteenth Meeting of the NOAA Science Advisory Board's
Environmental Information Services Working Group (EISWG)**

December 12-13, 2016
Silver Spring Civic Building
Silver Spring, Maryland 20910

SUMMARY

The following summarizes the Sixteenth Meeting of the Environmental Information Services Working Group (EISWG) of the NOAA Science Advisory Board (SAB).

EISWG Members in attendance:

Dr. Tom Altshuler, Teledyne Marine
Dr. Phil Ardanuy, Innovim
Mr. Ron Birk, Northrop Grumman
Ms. Nancy Colleton, IGES (Co-Chair)
Dr. Walter Dabberdt, Vaisala Group (Co-Chair)
Mr. Eddie Hicks, Morgan County, Alabama
Dr. William Hooke, American Meteorological Society
Mr. Barry L. Myers, AccuWeather, Inc.
Dr. Kevin Petty, Vaisala Group
Mr. Jonathan Porter, AccuWeather
Dr. Cheryl Rosa, U.S. Arctic Research Commission
Dr. Jennifer Read, University of Michigan
Dr. Justin Sharp, Sharply Focused, Portland, OR
Dr. John Snow, Univ. Oklahoma (Emeritus)
Dr. Bob Weller, Woods Hole Oceanographic Institution
Dr. Julie Ann Winkler, Michigan State University (by phone)
Dr. May Yuan, University of Texas - Dallas
Ms. Jean Vieux, Vieux and Associates

SAB Liaison:

Mr. Robert Winokur, Retired NOAA and the US Navy (SAB Liaison)

EISWG Members unable to attend:

Dr. Ann Bostrom, Univ. Washington
Dr. Mohan Ramamurthy, UNIDATA, UCAR
Dr. Xubin Zeng, University of Arizona

Presenters and Guests:

Ms. Elizabeth Akedy, Staff, NOAA Science Advisory Board
Ms. Laura Furgione, NOAA Deputy Assistant Administrator for Weather Services,
and Deputy Director, NWS
Ms. Andrea Bleistein, Physical Scientist, NWS Office of Organizational Excellence
Dr. Cynthia Decker, Executive Director, NOAA Science Advisory Board
Mr. Tom Fahy, Capitol Meteorologics
Ms. Mary Glacking SVP, IBM/The Weather Company
Dr. Monica Grasso, NOAA Chief Economist
Mr. Mark Lemmond, IBM/The Weather Company
Ms. Wendy Levine, NOAA NWS
Mr. John Murphy, NOAA NWS
Mr. Joe Pica, NOAA NWS
Dr. Josh Sawislak, AECOM
Dr. Kevin Werner, Director, NWS Office of Organizational Excellence
Ms. Jennifer Sprague-Hilderbrand, Senior Advisor, Office of the Chief of Staff, NWS/OAA/COS

AGENDA – DAY ONE

Monday, December 12, 2016

TIME	TOPIC	SPEAKER/FACILITATOR	EXPECTED OUTCOME
8:15 - 9:00	Meet and Greet	All	
9:00 - 9:30	Welcome, Introductions, and Overview	Nancy Colleton & Walt Dabberdt, EISWG Co-Chairs	Adoption of Agenda Introduction of New Members to EISWG Status of EISWG
9:30 - 10:30	Update on NOAA NWS	Laura Furgione, Deputy Director, NWS	Informational Update on OWA, GOES-R, Hurricane Mathew
10:30 - 10:45	Break		
10:45 - 11:45	NWS IDSS Philosophy and Plans	Andrea Bleistein and John Murphy, NWS	Informational and open dialogue.
11:45 - 1:00	Lunch Break	On your own	
1:00 - 2:00	NOAA Subcommittee Con-Ops	Cynthia Decker, Executive Director, NOAA SAB	Informational. Identify issues or recommendations
2:00 –3:00	Recapping the 2016 EISWG Review of the NOAA Partnership Policy	Ron Birk*, Nancy Colleton* and Walt Dabberdt*	. Informational. - Brief new EISWG members and identify possible EISWG actions
3:00 – 4:00	NOAA acquisition and availability of non-government data	Intro by Colleton and Dabberdt. Discussants: Barry Lee Myers*, CEO, AccuWeather Joe Pica, Director, Director, NWS Office of Observations May Yuan*, University of Texas – Dallas	Initiate a NOAA-EISWG dialogue
4:00—5:00	Cognitive computing and the future provision of environmental information services	Mary Glackin, SVP Science and Forecast Operations, The Weather Company	Informational.
5:00 - 6:30	Adjourn, Break		
6:30 - 8:30	EISWG Dinner	All EISWG Members and Guests	Copper Canyon Grill, Silver Spring

* EISWG member

AGENDA – DAY TWO

Tuesday, December 14, 2016

TIME	TOPIC	SPEAKER/FACILITATOR	EXPECTED OUTCOME
8:00 - 8:30	Meet and Greet	<i>All</i>	
8:30 - 9:00	Welcome, Introductions, and Overview	<i>Nancy Colleton & Walt Dabberdt, EISWG Co-Chairs;</i>	<i>Review of previous day results and actions.</i>
9:00 – 10:00	Environmental Information Needs for Infrastructure	<i>Josh Sawislak, Global Director of Resilience, AECOM</i>	<i>Informational. Provide input to EISWG planning and strategy</i>
10:00—10:15	Break		
10:15—11:10	Politicization of Science (and Science Integrity at NOAA)	<i>Justin Sharp*, Sharply Focused Julie Winkler*, Michigan State University Cynthia Decker, NOAA SAB Executive Director</i>	<i>Open dialogue.</i>
11:10-12:00	Economics and Social Science at NOAA, and the Blue Economy	<i>Monica Grasso, NOAA Chief Economist</i>	<i>Informational.</i>
12:00 – 1:00	Lunch Break	<i>On your own</i>	
1:00 - 2:30	EISWG Workplan, Discussions, Next Meeting, and Membership	<i>Colleton* and Dabberdt* All EISWG Members</i>	<i>Identify future EISWG meeting topics and finalize recommendations NEXT STEPS</i>
2:30 - 3:00	Summary and Adjourn	<i>Colleton* & Dabberdt*</i>	<i>Review actions, update work plan, and identify next meeting time and venue</i>

* EISWG member

SESSION SUMMARIES

Update on NOAA NWS

Laura Furgione, Deputy Director of the National Weather Service (NWS), provided the Environmental Information Services Working Group (EISWG) an informational briefing, working from a PowerPoint presentation (attached).

She reminded EISWG that NOAA's strategic plan revolves around the concept of a weather-ready nation (slide 2), "building community resiliency in the face increasing vulnerability to extreme weather, water, and climate events." She then briefly summarized the actions and means through which the NWS provides impact-based decision support services (IDSS) to myriad partners, working from the so-called bow-tie diagram (slide 3). She next brought these abstractions to life by using hurricane Matthew as a concrete example (slides 4 and 5). She updated EISWG on the status of GOES-16, following the successful launch on November 19, and suggesting that some early products might be ready for viewing by the time of the AMS Annual Meeting in January 2017 (slide 6). She then provided a second concrete IDSS example, this in the form of NWS support to the southeastern United States during fires of November – December, including the Gatlinburg fire (slides 7 and 8).

Deputy Director Furgione also reported that on 6 December, the Global Information System Centre Open WMO Information System (GISC-Open WIS) was declared operational on NWS integrated dissemination system servers in Boulder (slide 9). Her last three slides described the NWS Strategy Project, an iterative stepwise approach *carried out in consultation with partners* (her emphasis throughout) for diagnosing current markets, building scenarios for enterprise evolution, considering strategic options and then defining NWS strategy and initiatives (slides 10-12).

Considerable discussion followed. Nancy Colleton, EISWG Co-chair, stated it would have been helpful to engage EISWG more with respect to the strategic planning, citing a real need for genuine collaboration. Jean Vieux expressed her sense that small corporations such as hers were disadvantaged by the current collaborative process. Kevin Petty asked whether more attention should be given to leveraging the academic sector. Jonathan Porter asked how NWS can stay focused on the right/foundational things, vs. social science. Laura Furgione responded that NWS was working to clarify Weather Forecast Offices (NFO) roles in IDSS, making that collaboration more consistent and disciplined across the country. Chief Operating Officer (COO) John Murphy acknowledged there were lots of pieces, and that Kevin Werner and his office were trying to bring community feedback in to NWS. Philip Ardanuy suggested that NOAA give emphasis to national security in NOAA strategic planning. Justin Sharp suggested a national blend of models, and wondered whether forecast offices were shifting emphasis to IDSS at the expense of foundational work. Tom Fahy asked whether NWS was paying due attention to cyber security. Laura Furgione replied that a hack of Australia's bureau of meteorology, 18 months ago, had served as a wake-up call. Returning to the subject of academic engagement, John Snow noted that universities perforce have good engagement across the whole of federal agencies in ways that might be useful to NWS, and that NWS might reach out to the new University Corporation for Atmospheric Research (UCAR) management versus attempt to collaborate

with 100+ institutions separately. Laura Furgione answered that partnering with UCAR's new management was already underway, and mentioned the Office of the Federal Coordinator for Meteorology (OFCM) as a means for collaborating across agencies. Kevin Werner chimed in that training and education were other important topics for NWS and universities. Ron Birk asked whether NWS followed a standard charter, or framing, for how to structure its process for building a strategic plan? Jonathan Porter asked about model development. John Murphy cited a meeting on that topic in Boulder the previous week. Co-chair Walter Dabberdt (playing devil's advocate), asking whether even though it's important to "drive within the headlights" such approaches miss dramatic shifts in future conditions and needs. He suggested NWS needed to think through what work it should give up as it takes on new jobs – and think at the outset about how it will engage partners in the planning as well as the execution. Laura Furgione replied that for the first time ever, NWS will have an Enterprise Risk Manager; the status quo is unacceptable. Walt Dabberdt responded that long ago a mentor had told him organizations constantly need to ask, "what is our core? Today? In the future?" You can't hold on to everything. And Justin Sharp had the last word, noting that what is possible in the private sector has ballooned rapidly – the National Academy of Science (NAS) Fair Weather Report is more than ten years old and out of date. What's the new common good? The environmental intelligence/national security theme Phil Ardanuy had brought up?

NWS IDSS Philosophy and Plans

John Murphy, National Weather Service (NWS) Chief Operations Officer, described the relationship between the focus on Impact-based Decision Support Services (IDSS), the NWS workforce, and government core partners (see [NWS Service Description Document \(SDD\) Proposed Enhanced Impact-Based Decision Support Services, for the Emergency Management Community and Government Core Partners, Supporting Events/Incidents Impacting Safety of Life and Property May 2014](#)). NWS defines IDSS as "*provision of relevant information and interpretative services to enable core partners's decisions when weather, water, or climate has a direct impact on the protection of lives and livelihoods*" (see [NWS Weather Ready Nation Roadmap 2.0](#)). This was a highly interactive session between Chief Operating Officer (COO) John Murphy and EISWG members.

The intent of the IDSS philosophy is to look inward, identifying inefficiencies in NWS processes, and then applying those resources to address pressing IDSS needs. Upon selecting the NWS domain, the intent is to build IDSS toolsets to help the NWS forecasters do their jobs. Decision support is planned across the NWS spectrum of services, and COO Murphy noted that decision support for ENSO, water, and climate, is much different than for weather. Justin Sharp expressed a concern that if the well-meaning NWS attempted to provide services to a diversity of entities, they might not do an exemplary job for specific entities (e.g., energy sector), and would shut out private services suppliers who could not compete against free services of NWS. Murphy stated that NWS received 96 individual comments in response to the 60-day request for comments, and is reviewing those. In some cases, outside users need access to IDSS experts in the NWS, with a commitment from NWS to provide that access (e.g., Alabama emergency managers). Some 23% of NWS core partners (e.g., schools, hospitals) are in a "grey area" where services could be supplied by enterprise partners rather than the NWS. Barry Myers, Accuweather, made the point that, in a hurricane, external partners such as his organization would be able reach tens of millions of affected people immediately, whereas NWS currently might not.

NOAA Concept of Operations (CONOPS) for SAB Subcommittees (Working Groups)

NOAA has recently revised the concept of operations document that has provided guidance to both standing working groups and ad hoc task forces set up by the Science Advisory Board to collect information and provide recommendations to the SAB on specific topics. The original ConOps was published in 2012 with subsequent revisions in 2013 and 2015. This version is the result of a comprehensive review of what was originally a “best practices” document by the NOAA Office of General Counsel to ensure the SAB subcommittees are all acting in accordance with rules under the Federal Advisory Committee Act. Some changes have been made to language regarding establishment and disestablishment of subcommittees, membership, meetings, work products, and support for the groups (by NOAA and the SAB). The essence of most of these changes was a requirement for periodic review of the standing working groups, the requirement for a yearly work plan, and a requirement that NOAA make the final decision on matters such as membership.

Recap of the 2016 EISWG Review of the NOAA Policy on Partnerships in the Provision of Environmental Information

Walter Dabberdt, EISWG Co-chair, reviewed the history of the NOAA Policy on Partnerships, noting the EISWG terms of reference call for review every 5 years, highlighting the 5 key recommendations outlined in the report submitted to the SAB in January 2016. Ron Birk described the framework for the policy using a graphic showing the value chain, the sectors, and the line organizations of NOAA with multiple candidate partnership relationships. The EISWG members reviewed and discussed the set of recommendations in the report, along with interest on receiving feedback. Cynthia Decker noted there has not been an update on next steps since the NOAA Science Advisory Board (SAB) delivered the report to NOAA leadership in February 2016. EISWG members discussed the value of including plans for a supplemental review in the 2017 EISWG work plan.

NOAA Acquisition and the Availability of Non-Government Data

Cognitive Computing and the Future Provision of Environmental Information Services

Mary Glackin indicated that more and more contextual data will be seen as the internet of things develops. These many ancillary sources of data will supplement and extend traditional weather and climate data sources. She said that the volume of such data relevant to weather- and climate-oriented decisions is projected to be 180 zettabytes by 2025. Effective utilization of this enormous volume of data requires the development of new analysis tools and decision aides. Recently, three factors have impacted utilization of weather and climate data and the development of such tools and decision aides: 1) the proliferation of data; 2) ability to develop adaptive business code; and 3) growth in cognitive computing. These three factors are combining in ways that are producing a major “disruptive technology”.

She then focused on cognitive computing and described how IBM/The Weather Company is moving forward toward weather- and climate-oriented decision aides based not only on sensor data and model outputs but the multiple aspects of the context that will improve the aides. [Cognitive computing is characterized by: 1) the ability to understand, not only at the language level but also at the idiom level to better grasp context; 2) the ability to reason, extracting information and knowledge from data; and 3) the ability to learn and have the code adapt with time. Thus allows cognitive computing applications to interact with human users.] IBM/The Weather Company is applying state-of-the-art “business analytics” to hyper local weather and climate information,

folding environmental data in with the contextual data. IBM/The Weather Company is currently doing this with their “Sun platform” but will soon shift to using Watson, IBM’s top-end analytic engine (its mantra is “**Cloud. Content. Compute. Conversation.**”). Watson is unbiased, so it may pick-up on rare events that would otherwise be overlooked.

Mary closed by noting that the situation is evolving so rapidly that to keep pace the weather enterprise (public, private, academic) needs to think of new business models and redefine private-public partnerships. The private sector can bring more agility and also more ability to integrate the non-physical, socio-economic contextual data and thus be able to move more rapidly toward cognitive computing applications. However, the weather enterprise should share a common vision for the future, seeking clarity in terms of roles and minimizing confusion. EISWG is one way to help NOAA/NWS develop the vision.

In light of Mary’s presentation, it is worth noting the following to press release:

The Weather Company Named Most Accurate Forecaster in the World by New Study (Dec 21, 2016) -
<http://www.prnewswire.com/news-releases/the-weather-company-named-most-accurate-forecaster-in-the-world-by-new-study-300382557.html>

Environmental Information Needs for Infrastructure

Josh Sawislak is an expert in climate adaptation, infrastructure resilience, and business continuity. As a former member of White House Council on Environmental Quality, US Department of Housing and Urban Development, and Alexandria Transportation Commission, Sawislak is highly experienced in negotiating public-private partnerships between investors and owners/builder on large-scale construction projects (including real estate development and infrastructure). It is in this capacity that he spoke with EISWG on the intricate relationships among environmental information, risk estimates, investment decisions and changing policy strategies with the new administration. Engineering solutions to building and facility design must assess the spatial risk of natural hazards, and the risk assessment has to rely upon data. For large-scale construction, environmental data is essential to threshold the expected severity and return frequency of concerned hazardous events, such as floods, hurricanes, or droughts. However, most environmental data are measured or modeled at a large scale (regional or continental), some local places remain environmental data hungry and data downscaling is difficult. He communicated three key messages to EISWG: (1) While perfect data may not exist, agencies and organizations should seek collectively agreeable baseline data standards, so that projects across agencies or organizations can be properly compared. Consistency and agreement of data and procedures to downscale and process data are critical to the success of any multiagency projects; (2) The annual variability of climate data is more than the trend of climate. Therefore, it is challenging to set engineering standards to secure buildings or infrastructure. Climate and environmental information is critical to long term investment decisions made by institutional investors (e.g. pension fund or retirement managers) as well insurance and reinsurance companies; and (3) The new administration policy is likely to be market driven and accelerate social engineering on financial markets through investments and purchases. Collaboration with financial community can help determine financial indicators or matrices for clean water, clean air, and other fundamental needs for a quality environment that everyone can agree. We may think about how to use the market to drive the importance of clean water and clean air. We need to factor in market values and market factors in environmental information

for infrastructure. We also need information that is consistent in communication and in use to make investment decisions.

Politicization of Science (and NOAA's Science Integrity Policy)

NOAA has a comprehensive scientific integrity policy that is codified in NOAA Administrative Order 202-735D and its accompanying procedural handbook. There has always been an ability for the agency to handle allegations of research misconduct such as fabrication, falsification and plagiarism but this policy covers these as well as other aspects of integrity that are addressed through the code of conduct by scientists and the code of conduct by managers and supervisors. NOAA developed this policy as a result of a Presidential memo released in 2009 that was followed by a directive from the Office of Science and Technology Policy in 2011. The NOAA NAO was completed in 2013. NOAA designated Dr. Cynthia Decker as the NOAA Scientific Integrity Officer (SIO) in 2015. She is chair of a Scientific Integrity Committee made up of representatives from all the NOAA line offices, the Office of Marine and Aviation Operations, the Office of the Chief Administrative Officer, the Office of the General Counsel, and the Workforce Management Office. Information on scientific integrity in NOAA can be found on the Scientific Integrity Commons website. The SIO also manages the process for NOAA employees serving on the boards of non-profit organizations. It has also recently participated in the development of guidelines for the review of fundamental research communications under a Department of Commerce Administrative Order and will monitor the implementation of these guidelines.

Integrating Social Science at NOAA

Monica Grasso, NOAA Chief Economist for the Office of Performance, Risk, and Social Science, provided an overview presentation of the history of social science (SS) in NOAA, the role of SS in the agency and three current SS initiatives.

The **NOAA Social Science Vision and Strategy** (promulgated in July 2016): This is the culmination of a 13-year process that began with a SAB Social Science Review Panel Report in 2003 which called for the integration of SS at NOAA. In 2009 the SAB struck a SS Working Group which produced a SS Needs Assessment in 2013 and in 2014 a SS Tiger Team produced a series of recommendations related to implementing SS in NOAA. The 2016 Vision and Strategy incorporate the Tiger Team's recommendations which, Dr. Grasso reports, are widely accepted among NOAA leadership.

The Strategic Plan has Three Goals:

- 1) Evaluate impact of NOAA products and services;
- 2) Incorporate social science to improve decision making; and
- 3) Integrate social science into NOAA's vision.

Among the implementation structures is the **NOAA Social Science Committee**, comprised of SS reps from each line office forum to discuss and coordinate SS issues, and determine what might need to be elevated to leadership. The group also produces a **SS newsletter**.

Three Example Projects:

- 1) NOAA Products and Services Valuation:

This is an outcome of a value of information workshop convened to consider the value of NOAA information and products to society. Part of the goal is to justify NOAA budget and help determine priorities. One of the outcomes was the recommendation to form a value of information (VOI) community of practice to improve the quality/consistency of VOI studies; coordinate input from US agencies for use in international discussions; advance strategic goals; provide forum for information sharing and consultation. The community of practice is comprised of both public and private sector folks and they have open monthly meetings.

2) *Risk Communication and Behavior* (July 2016)

This is a product – a literature/research review to find best practices and research findings related to risk communication and human behavior. The document provides a range of recommendations for implementation as well as future research. The goal was to begin an internal conversation in NOAA and includes suggestions about ways to improve how NOAA communicates watches, warnings and other products to decision makers.

3) The Blue Economy:

Dr. Grasso provided a short summary of current NOAA accounting of the value of the ocean economy, based on 2005-13 data that looks at six economic sectors – living resources, marine construction, marine transportation, offshore mineral extraction, ship and boat building, tourism and recreation – at the county, state and regional levels. It demonstrated that within the \$17T US national economy, the coastal economy is \$8T and the ocean economy is \$350B. These data, Economics: NOAA Ocean Watch (ENOW), demonstrate that in 2013 the ocean sectors added 87,000 jobs, an increase of 3%, while the national average was 1.7%.

<https://coast.noaa.gov/digitalcoast/tools/enow.html> Dr. Grasso also noted that NOAA has an interest in developing a satellite account related to the ocean economy in order to capture those aspects that are not directly accounted for in the current metrics.

There were several questions and comments from the working group that served to clarify that the risk communication document is envisioned as a first step, for internal audiences, which will be updated over time. There was also a comment that the next NOAA-level strategic plan provided an opportunity to quantify the gaps and develop a plan to close them. Some aspects are easier to envision, such as reducing 10-day forecast error in a decade for all variables, while others, such as reduce weather-related deaths by 50% in a decade, are more challenging.

EISWG Work Plan for 2017 – Topical Areas and Themes

1. Response to the Partnership Policy recommendations report – The EISWG is not expected to get feedback from SAB in near term; update related to developments
 - a. Address definitions
 - b. Conduct supplemental review
2. Environmental information enterprise – profile current and evolving trends (pace increasing rapidly)
 - a. Event-driven architecture
 - b. Machine learning
 - c. Computing capacity
 - d. Observations – SPRWG, Terrestrial,

- e. Provide input to NOAA NWS IDSS plans
- 3. NOAA and NWS Strategic Plan process contributions wrt EIS
 - a. Urban-centric focus (i.e. Smart Cities)
- 4. Ecological forecasting
 - a. HAB
 - b. Arctic EIS
- 5. Trusted Information
 - a. Polarization of Science in Post-Truth era
 - b. Repackaged versus source
- 6. Water, Water, Water
 - a. National Center
 - i. Policy, Products, Foundational data
 - b. Enterprise products – market assessment
- 7. Data Exchange
 - a. Open Data - DAARWG
- 8. Visioning Session for 2018 - 2022
- 9. Evolution of social science and risk communication
- Attend AMS session on IDSS
- Attend AMS session on WRN
- Cynthia – SAB line offices and topics for action
 - o Ecological forecasting – HAB, - could be joint with Ecosystems
- Business leaders thrive on uncertainty, risk, and disruption

End of Meeting Summary